Scientific American.

THE ADVOCATE OF INDUSTRY, AND JOURNAL OF SCIENTIFIC, MECHANICAL, AND OTHER IMPROVEMENTS

VOLUME XII. NEW-YORK, JANUARY 10, 1857. NUMBER 18.

THE
Scientific American,
PUBLISHED WEEKLY
At 128 Fulton street, N. Y. (Sun Buildings.)
BY MUNN & CO.
O. D. MUNN, S. H. WALES, A. E. BEACH.

Responsible Agents may also be found in all the principal cities and towns in the United States.

Sampson Low, Son & Co., the American Booksellers, 47 Ludgate Hill, London, Eng., are the English Agents to receive subscriptions for the Scientific American.

Single copies of the paper are on sale at the office of publication and at all the periodical stores in this city, Brooklyn, and Jersey City.

TERMS—$2 a-year,—$1 in advance and the remainder in six months.

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Meteoric Iron Stones.

In some parts of the world, blocks, or rather loose stones of iron have been found lying on the ground, slightly embedded in the soil, and far removed from any rocks containing iron. These iron stones have been proven by analysis to be nearly pure iron, generally containing a little nickel—malleable, capable of being beat cold under the hammer into thin sheets, almost unoxydizable, and, for every purpose in the arts, equal to the best manufactured iron. There has been no more reasonable theory of accounting for their origin than that of attributing to them a meteoric source—projected, perhaps, from some of the volcanoes of the moon.

A few days since we had a visit from Mr. Charles Burchard, residing in Monterey, Mexico, who presented us with a specimen, and exhibited other specimens, of meteoric iron which he discovered in a Mexican valley near Santa Rosa, and which is, perhaps, the finest deposit of meteoric iron hail-drops in the world. In that spot there are twelve meteoric iron blocks, ranging in weight from 100 lbs. to 1 tun, some of them lying on the bare rock, and others slightly embedded in the soil. All of them have a clear ring, like bell-metal, and their surface is covered with but a thin film of red oxyd.

How and whence came they in that wild and secluded spot? They have the appearance of having once been in a plastic state, united in one mass, and to have burst into pieces.

Striking Effects of Civilization.

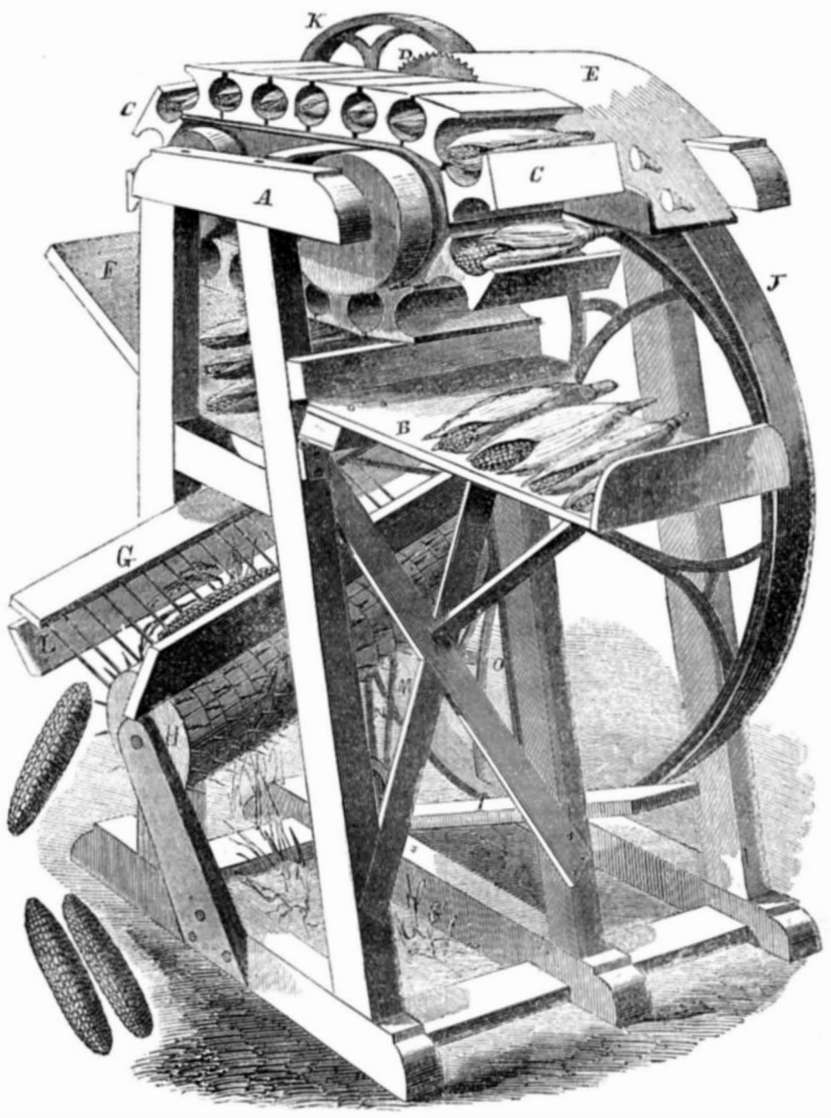
French journals state that the Rev. Dr. Livingstone, the celebrated African traveler, has returned to England, after seventeen years' absence. He crossed the great African continent almost in the center, from west to east, has been where no civilized being had ever been before, and has made many notable discoveries of great value. He has great difficulty in speaking a sentence of English, having disused it so long while traveling in Africa. He had with him a native from the interior of Africa. This man, when he got to the Mauritius, was so excited with the steamers and various wonders of civilization that he went mad, and jumped into the sea and was drowned.

Ship Building at New York.

During the past year there were launched at New York 12 steamers, 11 ships, 12 barques, and 20 others, with an aggregate tunnage of 15,620 tuns; while there are on the stocks 6 steamers, 3 ships, 3 barques, and 9 others, whose aggregate tunnage will amount to 17,150 tuns. This result shows an increase in the amount of tunnage launched, of 6,038 tuns over the year 1855; while the tunnage of vessels now on the stocks is 6,145 tuns less than at the same time last year.

Many of the steamships belonging to New York have been very unfortunate during the past year. The Collins' line has lost one, and those belonging to Commodore Vanderbilt have been laid up, and have done nothing for a number of months.

CORN HUSKING MACHINE.



This figure is a perspective view of a machine for husking corn, for which a patent was granted to Messrs. Taggart & Grover, on the 9th of December last.

A is the frame of the machine, and B is a table for holding the ears of unhusked corn ready to the hand of the operator. C is a revolving endless apron of adjustable clamps to receive and hold the ears of corn firmly, to have their butts cut off by a small circular saw, D to sever the husks where they are attached to the root ends of the cobs. The cut-off stubbs of the cobs fall on the inclined board, E, and roll down upon the floor or into a receptacle. The clamps are made of wood, secured on the flexible endless apron, and are so formed that they open out when passing over the end roller where the ears are put in, as shown, and then close as they move along. They are of a round form, to hold the ears firm when passing on a level to the action of the saw, as shown. The ears of corn, after their butts are cut off, drop down at the back end of the apron, C, upon the inclined board, F, thence into an inclined grating, G. Below the grate there is a revolving roller, H which has projecting spikes in its periphery. As the ears pass down on the grate, G, the spikes on this roller, projecting between the wires of the grating, catch the husks, and strip them off, and the clean ears then drop down, as represented, while the husks are carried below the roller. There is a back bar, L, on the frame of the inclined grating, in which are a series of small strong wire rods, which are inclined, and project into the circular grooves on the spike roller. These wires strip the husks from the spikes.

The spike roller is revolved by a band and pulley, and so is the saw spindle, and the endless feed table, C. This machine is adapted for being worked by a foot treddle, like a common hand lathe.

The operator stands in front of the table, B and while he feeds the unhusked ears into the clamps on the apron, C, with his hands, his foot vibrates treddle I, at the back of which it is connected to a crank, which gives motion to a pulley, from which, by straps, N M, the spike roller, H, the band wheels, J and K, receive motion, and through them, the small circular saw, D, and the feed table, C, are rotated. The husks, as they drop from the spikes, are ready for use, to be put into mattresses, without further preparation. All the parts of this machine are strong and simple, and not liable to get out of order.

With a machine like the one represented, driven by foot, two men can husk about four hundred bushels of ears in a day—40 bushels is a day's work for one man, therefore two men can husk as much corn with this machine as ten by hand. If driven by horse, water, or steam power, for which it is also adapted, of course it will do a great deal more work.

We have seen certificates of H. B. Brigham and H. L. Gliddon, farmers, one living at Brookline, and the other in Brighton, Mass., who operated this machine on their farms upon two separate occasions, one man driving it with his foot, and it performed as much work as ten men by hand.

Corn husking by hand is tedious and troublesome labor. A good corn-husking machine is an invention long sought after by our farmers as being one of the most needed and most useful. One of these machines may be seen at the Agricultural Warehouse of Messrs. Maher & Co., No. 197 Water st., this city.

More information respecting this corn-husker may be obtained by letter addressed to Messrs. Grover, Osborn & Banker, Roxbury, Mass.

Cable for the Atlantic Telegraph.

A section of the cable intended for this telegraphic line has been on exhibition at the Merchants' Exchange, this city; it is of peculiar construction. It is three-fourths of an inch in diameter. In the centre are seven small copper wires, twisted upon themselves, and the whole insulated by a thick covering of gutta percha. Eighteen strands of slender iron wire, each strand composed of seven threads loosely twisted upon themselves, constitute the outer covering. The weight of the whole is 18 cwt. to the mile, and its strength such that it will bear in water over six miles of its own length if suspended vertically. Its specific gravity is such that it is thought there can be no question about its sinking readily to the bottom, being much heavier than the shells brought up by sounding. The objection that the strands of wire forming the outer covering will suffer corrosion or decomposition, is met by the statement based, it is said, on satisfactory experiments, that in corroding, the material of which the outer covering consists will enter into chemical union with the soft mud in which the cable is embedded, and will thus form a concrete mass of calcareous or siliceous substance, affording its very best possible protection. The gutta percha and central copper wire are thought to be indestructible under water. The flexibility of the cable is such as to make it almost as manageable as a small hemp line. Its selection was the result of months of experiment and trial—hundreds of specimens having been made, comprising every variety of form and size and structure, before this particular one was agreed upon.

It is to be manufactured by a company in London, and is to be 2,600 statute miles long, although the distance between Newfoundland and Ireland is only 1,900 miles; the inequalities of the ocean's bottom require it to be 700 miles longer than the actual distance between the two shores.

The cable is to be completed by the 30th of next May. Two steamers, each bearing half of the cable, will directly sail from London for the middle of the Atlantic, and will head different ways, "paying out" as they go.

Railway Festival.

The employees of the New York Central Railroad hold their annual festival on the 14th of January at Syracuse. The preparations have been made on a scale of liberality and expense seldom reached on such occasions, and the managers intend making an interesting thing of it. It is far better for the employees of all roads to have something of this kind once a year, by way of excitement, instead of holding "conventions" or striking at the enforcement of rules of safety. The best feature of these railway festivals is, that the proceeds derived from the sale of tickets go to increase the fund for the relief of employed men who have been injured on the road, and the families of those who have been killed. Thus it is a work of charity to attend one of them.—*American Railway Times.*

Losses by Fire in the United States.

The number of fires in the United States during 1856, at which the loss exceeded $20,000, was 227, and the damage was $21,160,000, while the number for 1855 was 198, and the losses $13,043,000. If we add to the above the amount of property destroyed by fire, where the loss was less than $20,000, we find the aggregate would probably reach $27,000,000 for 1856, and $19,000,000 for the preceding year.—*Philadelphia Ledger.*

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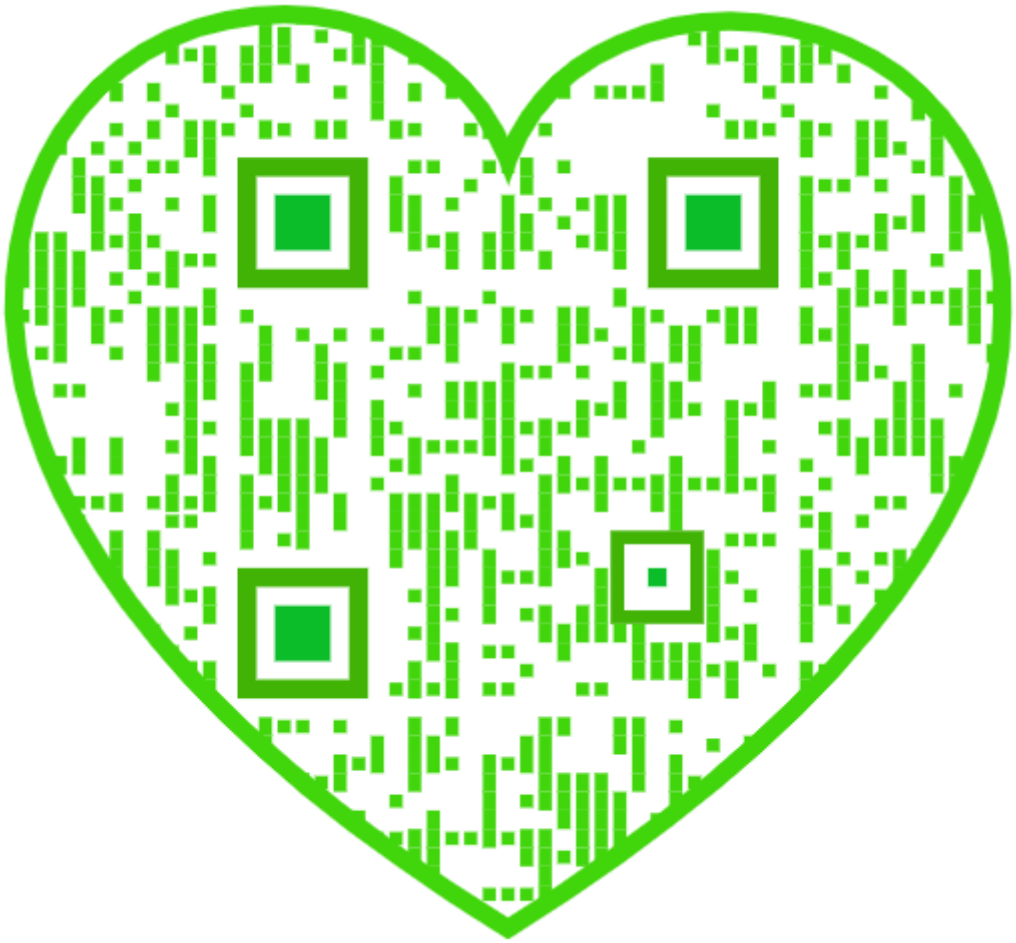

Patent Cases in Congress.—The Woodworth Planing Machine.

We publish *in extenso* the following letter from the *New York Herald*. It will be read with deep interest, as it completely uncovers the whole scheme. The most expressive commentary we can utter is that it emits a most foul and disgusting odor :—

"In my last, alluding to the schemes before Congress, I briefly sketched the merits of the Hayward Sulphur bill, and touched upon McCormick's application to Congress for a revival of an expired patent, and the attempt to procure a renewal of the Colt Pistol Patent.

None of these bills exceed the Woodworth Planing Machine Patent in the richness of their gold mines. The patent for the Wood worth machine expired on the 27th of this month (Dec.,) after having been renewed by the Commissioner of Patents, and still further by the special legislation of Congress. It has existed for nearly thirty years, and notwithstanding the immense profits of the monopoly, its owners are insatiate, and desire its further continuance. Mr. Woodworth, the son of the inventor, and one of the present proprietors of the patent, has addressed an autograph letter to several Members of Congress, making, of course, an *ex parte* statement, and appealing for 'relief.' In this letter he says :—

'The assignees are unanimously in favor of a further extension; therefore, as I understand it, there is no one opposed to the extension.'

On its face it seems that if the parties who now pay for using the patent are in favor of its extension, the public cannot object to it. A slight explanation will put a different complexion upon the matter, however, and show that the fact of the assignees being in favor of the scheme, is one of its worst features—it being nothing more than a conspiracy to continue taxing the public for the benefit of a combined monopoly, as I will demonstrate

The principal parties who own the Woodworth Planing Machine Patent are Jas. G. Wilson, Edward Bloomer, and Wm. W. Woodworth. As a general thing they do not manufacture the machines themselves. They sell the right to manufacture and use them in districts throughout the United States, charging in addition so much for every board planed, and not permitting the boards made in one district to be sent to another. Thus the person who purchases a right for North Carolina, for instance, cannot manufacture the yellow pine of that region and send it North for use. It is easy to see that if this could be done, he could sell his boards cheaper in New York than the man who transports the timber in the rough, and manufactures it into boards there; for the latter has to pay the freight on all the waste lumber before it is dressed whilst the former would have none of this expense—an expense, by the way, which comes out of the pockets of the consumers, according to the Woodworth Company arrangement. Here at once it is seen that all competition is cut off between the different leases of the machines—a competition which could be beneficial to the public.

These different 'assignees,' as Mr. Woodworth terms them—that is, persons who have purchased district rights—were heretofore found troublesome when the company desired an extension of the patent, because all leases expire with the extension, and the parties in question had no interest in desiring a continuance of the monopoly. This opposition has been done away with by the Woodworth Company agreeing to renew all the leases upon the same or better terms, whilst all persons who might hereafter purchase rights are to be charged a higher sum and a larger tariff upon the boards worked up. The result will be that the present holders of rights will become, as it were, partners in the monopoly to the extent of the difference between what they are to pay for using the patent, and what will be charged to the public who may desire licenses. It is an exceedingly pleasant arrangement, and at once accounts for the 'universal' favor which Mr. Woodworth asserts exists on the part of the 'assignees' for a further extension of the patent. The wording of the agreement in question is somewhat indefinite, and one of the 'assignees' becoming alarmed, has let the secret out.

Besides this, blanks have been sent to the different assignees to fill up, pledging themselves to pay a certain sum in order to secure the passage of the extension by Congress. The sums vary according to the value of the districts. The blank I have seen was filled up with $250. How much has been raised in this way it is impossible to ascertain, but it is said that $500,000 is the sum; and in view of the immense value of such an extension to the parties interested, the amount is probably not exaggerated.

There is one other feature in the transactions of this company which is deserving of notice. In consequence of the immense wealth acquired under the patent, its owners are able to crush all efforts to make other machines which may do the work as well or better. Thus the moment the attempt is made, a suit is commenced for an infringement, and in nine cases out of ten the frightful costs of such a suit are sufficient to deter the poor inventor from entering the lists against such aggregated wealth. But if—as in some cases has happened—the parties fight it out, and establish the novelty of their invention, and their right to use it, the Woodworth monopoly at once buy it up, and that is the last of it. Thus Daniel Barnum, of Philadelphia, succeeded in inventing a planing machine which the courts decided was not an infringement of the Woodworth patent, and the latter company immediately purchased the Barnum patent and buried it. Mr. Beardsley, of New York, was also silenced in the same way. This monster company, it will thus be seen, swallows up all other inventions, either by crushing suits and enormous bills of costs, or, if that fails, then, by the aid of its vast moneyed resources, it purchases them.

The further continuance of this monopoly directly affects the interests of every man within the United States. It has been protected by the government for 28 years, and it is now sought by a combination of interests and the wealth of the parties engaged in it to perpetuate the tax. Its extension will embrace the cost of buildings, and as a consequence, rents also. The poorest man in the country is thus made to pay his quota towards sustaining the monopolists. The plan which has been adopted of creating a large fund to secure its passage, affects no less the honor of Congress than the interests of the people. Two dollars a thousand feet is now charged for planing. The instant this bill passes, $4 will be the price.

Several of the State Legislatures have at different periods sent remonstrances to Congress against the further extension of this patent. Of late the matter has been kept so quiet that suspicion has been lulled. As the patent expires on the 27th, great exertions will be made to get the bill passed at once, and those, therefore, who are opposed to it should lose no time in sending in their remonstrances. It is probable nothing but the most energetic course can arrest the scheme."

Seeing Stars.—A Deceptional Reflecting Telescope.

MESSRS. EDITORS.—In a late number of the SCIENTIFIC AMERICAN, a correspondent—"Vulcan," of Cambridge, Mass.—tells us how to observe the satellites of Jupiter with an ordinary looking-glass; but he is mistaken. It is easy to see how he has been deceived. Take a common looking-glass, and the more untrue its surface the better it is to make moons with, whether they be Jupiter's or your neighbor's light in a window at some distance off. Get the planet to enter at a very obtuse angle and you will see what might, at first sight, be taken for the moons; but gradually bring the planet to enter at an angle as acute as your head will permit, and you will see the supposed moons gradually approach the planet, so that if you could get the light of it through your head, so as to go in and out of the glass perpendicular to it, there would be no moons left. The reason why these moons appear, is simply because the surface of the glass is not perfectly flat, and the surfaces parallel one with the other. You get the bright reflection of the planet from the quicksilvered side, and the dim moons, as you may call them, from the upper surface.

If "Vulcan" will get a good parallel reflecting glass, such as are used in quadrants or sextants, and then see Jupiter's moons in it, he will do more than has yet been done with the naked eye. J. O.

Bloomfield, N. J., Jan., 1857.

Natural Curiosities of New Zealand.

One of the most remarkable features of the island of New Zealand—situated in the South Pacific, and the property of Great Britain—is the numerous warm and hot springs and lakes, geysers, &c., which exist there, in connection with the volcano of Tongariro, in the central part of the northern division of the island. In the neighborhood of this volcano is Lake Tanpo, thirty-six miles long, on the shores of which are numereus hot boiling springs and ponds of warm water, which the natives enjoy for bathing purposes. The temperature in them ranges from 95° to 125° Fah. The water of the lake itself steams in the neighborhood of the shore. One or two inches below the surface the thermometer is often 110° Fah., but lower down sinks to 60°. Close to the hot springs there are very strong cold saline ones. This large assemblage of springs covers an area of about ten square miles, and the entire area seems to be only a thin crust over subterraneous and volcanic caverns. This crust is about a foot in thickness; below is a grey, soft, and generally hot mud. It often happens that this crust breaks in, and dreadful scaldings not unfrequently occur. Here may be seen the process of decomposition of volcanic rocks going on, and the separation of the aluminous earth or clay, by means of the subterranean vapor and hot water.

The natives make a peculiar use of some of the warm springs which abound in this region. They surround them with stones, and thus form a basin in which they are continually sitting. They make a new application of the seat or hip bath, by using it in the place of a fire, jumping in as often as they feel cold. The practice does not seem to hurt them, they being remarkably healthy in appearance.

The Ambrotype Art.

A writer in the *Journal of Commerce* gives some interesting facts concerning the art of photography. He states that but a short time ago there were one hundred and fifty daguerreotype rooms in this city, employing on an average five persons; but now, by the introduction of new processes not easily attainable, many of the old operators are irretrievably ruined. He asserts that the finer texture and subdued coloring of the plate glass ambrotype led to the relinquishment of the metallic plate, so that the unnatural glare of the latter was avoided, the effect produced being more like that of a fine engraving. Another advantage is that the impression is taken instantaneously, so that the features are not disturbed by fatigue or impatience.

Small ambrotype pictures are taken in some establishments for 25 cents; but they are very indifferent pictures. We do not agree with the above remarks respecting the common pictures taken on glass; although they are now very common, and have superseded the daguerreotype in a great measure; they appear to us to be inferior in almost every respect to the daguerreotype. Photographs taken on paper are more beautiful than those taken on glass, or on metal plates, and we are glad to perceive that our artists are improving in this delightful branch of sun painting.

Merit Rewarded.

Thomas Clark, Esq., favorably known to the city press as the gentlemanly manager and superintendent of the Newspaper Department in the City Post Office, received on New Year's Day a substantial token of the appreciation in which he is regarded by his fellow employees in that establishment. The present consisted of a solid silver tea service properly inscribed, and elaborately ornamented. This token is particularly gratifying to Mr. Clark as it was, we are informed, entirely unexpected on his part. We may add that the compliment was bestowed upon a most worthy gentleman.

A huge bust of Minerva has been dug up at Rome; its nose is sixteen inches long. It is stated to be a great work of ancient art.

American Iron Manufacture.

The *United States Gazette* (Philadelphia) states that 439,186 tuns of iron were manufactured in Pennsylvania in 1856. This amount is classified as follows :—

278,941 tuns were anthracite pig iron; 66,-970 hot blast charcoal pig iron; 56,225 cold blast charcoal pig iron; 24,550 coke pig iron; 12,500 raw bituminous coal pig iron. Of finished iron there were manufactured 227,837 tuns, comprising 121,550 tuns of nails, rods, and bars; 82,107 tuns of rails; 21,505 tuns of sheets and plate; 2,675 tuns of hammered bars.

The *Gazette* says :—"The iron produced in the United States for the same period is estimated at one million of tuns; consequently our State contributes nearly one half of the domestic supply. During that period the whole country consumes 1,386,000 tuns, one-third of which was furnished from Pennsylvania. It is conjectured, on the basis of such facts as could be searched out by a gentleman pre-eminently versed in this subject, that the sum total of iron manufactured in all countries fifty years ago, did not exceed 500,000 tuns—a trifle over the present production of this State.

Our manufacture equals that of England in the year 1823, although in England the business had been in progressive operation at that time for more than one hundred and fifty years. The yield in Great Britain for the past year was, in round numbers, three and a half millions of tuns; the production of Pennsylvania was, therefore, nearly one-seventh of that stupendous and almost incredible amount, a fact gratifying in itself, and full of promises for our future. With the exception of Great Britain, France alone, of all the European countries, produces a larger amount of iron than our own State. It made 650,000 tuns in 1855. Prussia comes next, having made 400,-000 tuns in that year; and Russia is still further behind, its production having amounted to no more than 300,000 tuns."

It is certainly very gratifying intelligence respecting the rapid progress of a branch of manufacture upon which all the arts are so dependant. In ten years from the present date more iron, we believe, will be manufactured annually in our country than in England

Statuary for the Capitol.

A correspondent of the *Commercial Advertiser*, at Rome, gives a description of the fine statuary in Crawford's studio, designed for the Capitol at Washington, and for private citizens. The statue of "America," to be placed in the lofty dome, is twenty feet high, and stands with the right hand resting on a sheathed sword, and the left on the shield of our country. On the breast are the initials of the United States, and a delicate drapery is so arranged as to form rays of light proceeding from the letters. The ample folds of an outer drapery fall majestically around the statue, leaving only the hands and a portion of the neck uncovered. For the usual cap, the artist has substituted a helmet, the crest of which is an eagle's head, with a richly falling plume of feathers. The countenance is wondrously beautiful, full of dignity and purpose, earnestly and thoughtfully looking out into the great future."

The statue of an "Indian," intended for the eastern pediment, is a nude figure, expressive of profound grief for the death of his nation The anatomy and repose of the figure are admirable; but the great speechless woe that bows the head upon one open palm, while the other hand is clenched in agony, is a triumph of art.

Several bas reliefs for the bronze doors of the Capitol, representing national events, are to be cast at the Munich foundries.

More Camels.

The U. S. storeship Supply has again gone out to the Mediterranean for a cargo of camels, and will stop for them at Smyrna. Mr. Heep is engaged in selecting the best kind for transportation to Texas, and the Turkish government has ordered the officials at Smyrna to furnish him with every facility, and to give him six of the finest camels in the country to show the respect felt by the Sultan for the United States.

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Improvement in Constructing and Working o Locomotives.

(Continued from page 134.)

In the following part of his paper, Mr. D. K. Clarke discusses important questions relating to the arrangements of the machinery and running parts of locomotives. It is, certainly, the most interesting portion to locomotive engineers and managers of railroads. It deserves general attention, because he throws much additional light on constructing and working locomotives, just where light was wanted.

The Carriage.—In the design of the carriage it is required that a sufficiency of weight should be placed on the driving wheels for adhesion, and that the machine should run freely and steady at all speeds.

In the earlier classes of engines, various circumstances operated to make them unsteady—a short wheel-base, the overhanging masses, the unbalanced revolving and reciprocating masses of the crank and the piston and its appendages. The evils were aggravated with outside cylinders, as compared with inside, on account of the greater spread laterally of the swinging masses. These evils were sought to be remedied by various experiments. The extension of the wheel-base, lowering the boiler, loading the foot-plate behind the fire-box with cast-iron, coupling the engine very stiffly to the tender, the use of three balanced cylinders, stiffening the frame, and the most prominent expedient of all, placing the driving wheel behind the fire-box. On the system of the hind drivers, the load was necessarily placed almost entirely upon the extreme axles, fore and hind, to insure a sufficiency of driving weight; it followed that the horizontal leverage of the wheels with their loads, and their resistance to horizontal sinuous motion, were increased, in so far as a greater disturbing force is requisite to sway an engine about one of its extreme axles than about a central axle, and greatly superior steadiness was obtained. This system, however, though it removed instability externally, left the swinging masses unbalanced; it also involved a longer wheel base, and a heavier engine than on ordinary engines.

The form of engine primitively adopted in the *Planet* by Stephenson, was with four wheels and inside cylinders. This arrangement was succeeded in Stephenson's practice by an engine with a third pair of wheels behind the fire-box, to check the vertical pendulous movement of the engine. Expansions of this normal arrangement were, the inside cylinder engines of Sharp, Wilson, Kitson, Bury, Stephenson, Hawthorn, and Gooch. The course of improvement and alteration in the arrangement of outside cylinder engines was taken up by Stephenson, Stirling, Allen, J. V. Gooch, Crampton, and Adams. An adaptation of driving-wheels behind the fire-box to inside cylinders was made; and Stephenson's method of hind drivers was applied by Mr. Adams to light tank engines on four wheels. The position of the center of gravity, horizontally, in each of the engines, may be deduced by a simple process, from the loads on the wheels.

The remarkable uniformity with which the leading idea of a central driving axle, in front of the fire-box, initiated by Stephenson, is adopted by almost all the others, will be noticed. The reasons which led to this uniformity of practice are not difficult of appreciation and they are worth some consideration, as bearing on the general question of single-wheel engines.

In the first place, there is the demand for a sufficiency of driving weight to supply the required adhesion for traction; but the apportioning of the driving weight to one pair of wheels must be executed with a regard to the requirements of the others, which are carrying wheels simply. The function of the front wheels is to lead the engine, and that of the hind wheels, as carriers, is mainly to steady it; thus, the front wheels require a greater load than the hind wheels, but not so much as the drivers; and the drivers stand first, the leaders next, and the trailers last in the order of loading.

It naturally follows that for the driving-wheels of single engines, the most likely situation is at some little distance behind the center of gravity of the whole machine, because the supply of load to the drivers in that situation is the most direct, and, in the adjustment of the driving load, the loads on the other wheels are individually less affected than when the drivers are far from the center of gravity.

It might be said, as a precautionary suggestion with reference to the system of central driving-wheels, that the drivers should be placed some distance behind the center of gravity, to insure a sufficiency of weight on the leading wheels. This condition is easily met in practice, because, conveniently enough, the center of gravity of ordinary engines is situated three or four feet in advance of the fire-box, and there is room for the driving axle behind it.

[In two paragraphs he points out the defects of the well-known Crampton locomotive, its loads being mainly thrown on the extreme axles; it runs heavily and severely along curves, the labor being increased by an extended wheel base.]

He afterwards says :—

"All these objections are avoidable in the ordinary system with central drivers, and this system only wants maturing to make it quite satisfactory as a carriage. The one primary and sufficient condition is, that the revolving and reciprocating masses of the pistons, piston rods, cross heads, connecting rods, and cranks, should be balanced in the wheels. This condition was pointed out ten years ago, by Mr. Stephenson, in his evidence before the Gauge Commissioners, in 1845; and he at the same time exposed the fallacy that the action of the steam on the pistons had anything necessarily to do with unsteadiness :—"When the steam presses upon the piston," he says, "it at the same time presses against the lid of the cylinder; the action and reaction must be equal. Therefore I do not believe that it is the steam that causes the irregular action; but I believe it to be the mere weight of the pistons themselves, and, if we could contrive to balance the pistons by the weight upon the wheel, we should get rid of that very much." A complete balance can be effected, and it has been done by the author, for the first time in this country, so far as he is aware, in the outside engines of the Great North of Scotland Railway, designed by him. These engines run with absolute steadiness at the highest speed attained on that line, without the least internal disturbing action of any kind.

All classes of engines, with inside or outside cylinders, single or coupled wheels, may be satisfactorily balanced on the principle above indicated. In general, the locomotive stock of England is very imperfectly balanced."

Economy of fuel is materially promoted by the correct equilibration of engines. With Mr. Beattie's permission, he (Mr. Clarke) put in balance the *Canute* engine, to supply an example. This engine had previously a balance weight of 85 lbs. applied within the rims of the driving-wheels. New weights were put in, weighing 186 lbs. for each wheel, and balancing the whole mass, acting at the crank pin. The engine ran so much more steady and freely with the new balance weights as to take the engineman by surprise; on the first day after the alteration, it considerably overshot the stopping stations. The saving of fuel was found to be 20 per cent. of its original consumption.

Another locomotive—the *Norman*—an outside cylinder coupled goods engine, on the South-western Railway, was also equilibrated according to the plans of the author. Such engines, unbalanced, are the most unstable of all, and the saving by equilibration should be all the greater. The engine and tender were taken alone, on a trial run, with the balance weights complete, and they run at speeds of more than sixty miles per hour, with perfect steadiness, excepting the disturbances due to the road, there not being the least oscillating motion of any kind. The counter-weights were then taken out of the wheels, and the engine and tender again run out alone; but so violent was the oscillation of the engine, both laterally and fore-and-aft, and so violent also the concussions between the engine and the tender, that the engineer could not venture to exceed a speed of about twenty miles per hour; and two strong hooks between the engine and tender were successively broken across, owing to the lurches of the engine.

(Concluded next week.)

Experiments with the Chinese Sugar Millet.

Messrs. Editors—Knowing that you take a deep interest in anything which promises to be valuable for our country, I send you the result of a experiment which I made with the Chinese Sugar Millet—*Sorghum Saccharatum.*

Having received from the Patent Office a paper of the seed, I planted it as a matter of curiosity, though not having the least confidence that it would prove to be worth anything. The seeds and stalks so nearly resembled our common broome corn as to make me feel quite sure that they were these.

I planted it in hills, about 2 1-2 feet apart, with 6 to 10 seeds in a hill. It was greatly neglected during its growth, from an impression of its worthlessness.

Some time in August there was a chance frost which nearly terminated its growth, and, in fact, completely destroyed some sweet corn growing in the same garden. The millet was just putting forth its seed stalk, and the seed was, consequently, all destroyed. The stalks, however, were left standing until some time in October, when—still supposing them to be worthless—I had them cut, and thrown into piles, to get them out of the way.

After they had lain upon the ground for some time, I took a handful of the stalks and gave them to my horse, who eat them greedily—eating both leaves and stalks.

About this time I saw a statement in the papers that some person had made some molasses from this plant. This led me to make the following experiment with mine, although I had reason to suppose that the frost and the exposure on the ground would have destroyed any good qualities which it might have originally possessed.

I took some of the canes and cut them into pieces about three inches long, when they were readily ground through one of Hickok's Portable Cider Mills, with cast-iron grinders; and then pressed with the powerful pressers attached to the mill. The quantity ground was about half a bushel of the pieces, and the juice expressed was about seven quarts. This juice, when evaporated, made one quart of molasses, that is pronounced, by those who have tasted of it, to be superior to the New Orleans molasses, and some say, equal to the flavor of the maple syrup. It is, at all events, good molasses.

From an estimate made, I judged that the square rod of ground planted—if the canes had all been used—would have produced four gallons of molasses, or at the rate of 640 gallons per acre. Such a crop would have proved valuable the last year, since sugar and molasses are so high.

There is little doubt in my mind that any person who has a small piece of land may manufacture his own molasses, and, perhaps, sugar.

If cultivated on so small a scale as not to warrant the expense of erecting the rollers for expressing the juice from the cane, they may be cut up in a straw cutter, and ground in one of Hickok's portable cider mills, with such facilities that two men could obtain five or six barrels of the juice per day by hand, and proportionally more if horse or other power is used. This juice could be cheaply boiled in one of the evaporators with which you are acquainted without burning the syrup or wasting any fuel.

Besides the molasses obtained from the stalks, the leaves will make good forage, the seed will nearly equal that of a crop of corn or oats, and the tops will make brooms.

With all of these advantages, may not the sugar millet prove of great value to the community? Every family in the country can make their own sugar and molasses, while, at the same time, the seed, forage, and brush for making brooms will pay all of the expenses of raising the crop.

Those having seed to spare, will do well to make it public, that more experiments may be made during the next summer.

H. G. Bulkley.

Kalamazoo, Mich., 1857.

[The experiments of our correspondent are certainly valuable facts, not only to our farmers, but our whole people. We hope that fair and full experiments will be made with this millet during the next season, and now is the time for farmers to prepare and lay out their work

Steam Engines for Grist Mills.

Messrs. Editors—Since you published my letter in your valuable paper (Nov. 10, 1856,) I have had frequent letters of inquiry in regard to running flour mills by steam with single engines, and as I am willing the world may have the advantage of my experience, I know of no better way than to give it through the Scientific American. My plan is to build the engine of a large bore of cylinder, short stroke, with single steam chest full length of cylinder, steam ports as near the end of the cylinder as possible and large, and with a single slide valve so made that it will cut-off at half stroke, worked by an eccentric on main shaft. I use double slide bars, cross-head between, recessed and filled with soft metal. I make a strong connection rod with two taper bolts through straps at each end; turn the main shaft its entire length, and have bevel pinions on its end to work in a bevel cone wheel on an upright shaft, and use a spur cone wheel for mill stone pinions, in the usual way. I employ one large double flue boiler, and find it better to have some steam to spare than not enough; I work the steam from 40 to 60 lbs. per inch, and gear the mill so as to travel the engine piston 500 feet per minute.

I am building mills of this description and have good success, I get a steady motion, plenty of power, with low steam, and a still running mill,—four very essential things to complete a good mill. Lyman Hatfield.

Cuyahoga Falls, Ohio, Dec., 1856.

Experience with Ice Houses.

Messrs. Editors—I noticed a few weeks since, an article in the Scientific American in regard to Ice Houses; but your experience and mine do not agree, as you direct persons to dig into the ground, which I think they should avoid.

Two friends of mine—one a physician, and the other a man who wished to start an ice cream saloon—started at the same time to build ice houses. The doctor dug into the ground, and made a double floor and wall, and a double brick arch over the top, so as to leave an air space all around. It must have cost him $500 at least, and by the first of August his ice was all melted.

The other made a double house of slats and cheap boards, and set it in the shade of the surrounding buildings. It did not cost him over $25, and his ice lasts from year to year. Another friend dug down into a hill-side until he came to the rock, but his ice all wasted before the summer was half over.

To any one who wishes to build a cheap ice-house, I would say, build a double house entirely on top of the ground, with double floor and door, so as to have an air passage all around, and arrange it so that all melted ice shall be drained off immediately; if possible, set the house where it will be sheltered from the south winds and sun. Pack your ice into it tight, and freeze it down, and I will insure it to keep from year to year.

Henry F. Snyder.

Williamsport, Pa., Jan., 1857.

[Our correspondent's experience is very useful, but we advise him to read the article of ours on page 72, this volume, to which he refers a second time, and he will find that he has mistaken our views. Our specific directions for building an ice house and packing the ice were nearly the same as those in his letter.

Twenty-seven steamboat accidents occurred in 1855, by which 176 persons were killed, and 107 were wounded. In 1856 there were 29 accidents; 358 persons were killed, and 127 were wounded. This is very discreditable to the Inspectors; it appears as if they had grown more careless of their sacred trust.

A subterranean river has been struck by the persons engaged in boring an artesian well at Henderson, Ky., from which a jet of water is forced up through the bore, and thrown to the hight of fifty feet above the surface of the ground.

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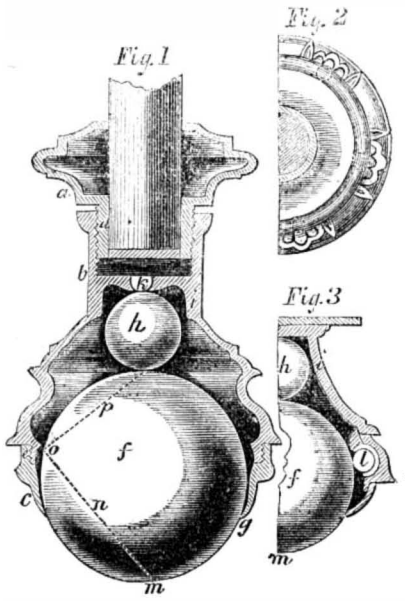
New Inventions.

Improvement in Casters.

The annexed figures are views of an improvement in casters for articles of household furniture, invented by Messrs. Bird & Rose, and illustrated and described in *The Engineer*, London. The nature of the invention consists in making the lower or rolling part of casters in the form of spheres, globes, or balls, of any convenient dimensions, having their upper parts pressing against one or more smaller balls or spheres, the whole being inclosed in suitable standards or frames, either with or without anti-friction rollers, pulleys, or balls. The frame of the caster is provided with a screw, in order to lengthen or shorten it when required, to adjust the article of furniture to a proper hight, and if the surface of the floor is uneven, to adjust it to the various inequalities, and give it a perfect level, which arrangement will be found peculiarly applicable to pianos and similar articles.

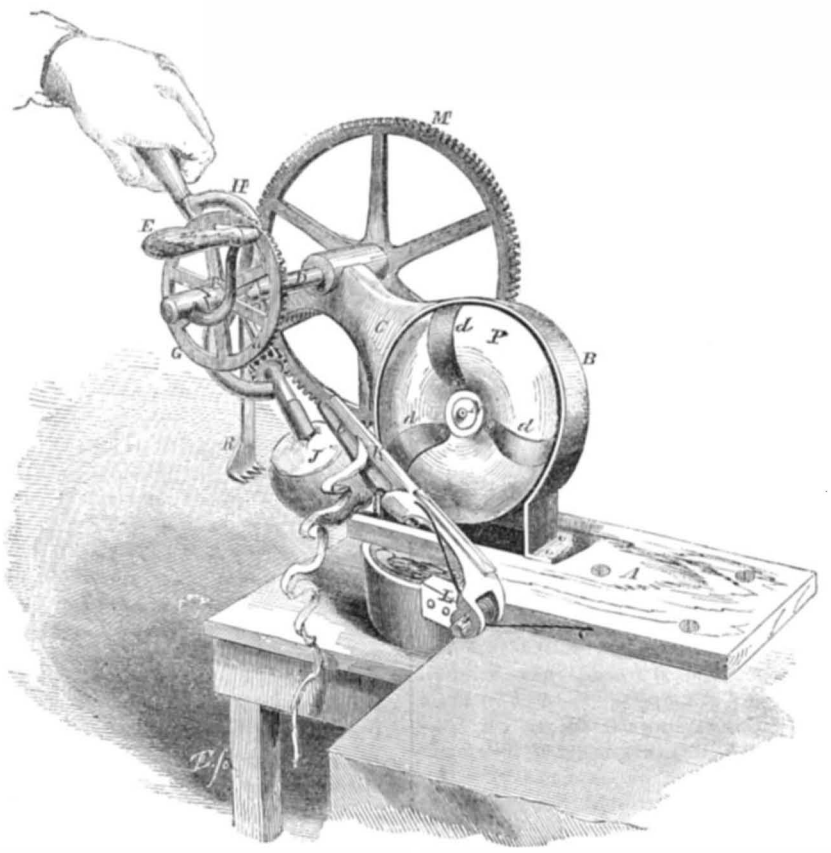
Fig. 1 is a sectional elevation of a large caster, having a propelling edge or rim without anti-friction pulleys or rollers; fig. 2 is a part sectional view of a caster with antifriction pulleys, showing another mode of attachment to the article for which it is required; and fig. 3 is a part plan of a caster in which balls or spheres are employed, instead of anti-friction pulleys or rollers.

In fig. 1 the frame of the caster consists of three parts, *a b c*, the part *c* being the keeper. The sphere or roller is shown at *f*, being a little smaller at one-third of the diameter from the top than the propelling edge, *g*, of the frame, to allow freedom of action for moving in any direction; the upper part of the sphere or ball plays a smaller sphere or globe, *h*, placed within the cup, *i*, having a pointed or spherical surface, *k*, which is made of glass, steel, patent metal, or other hard material, which forms a fulcrum at about the center. The sphere or ball, *h*, fits loosely within its cup, *i*, so that it may be able to move in any direction, or a fast or loose convex center may be substituted for it. In fig. 3 the lower ball or sphere is bounded at the sides by anti-friction propelling rollers or pulleys, *l*, any convenient number of which may be used; but it must be observed that the said anti-friction



rollers or propelling pulleys have no weight whatever to sustain, the whole weight resting vertically on the bottom sphere and center point, leaving the propelling edges and propelling balls or pulleys perfectly free from any weight or resistance. When desired, a caster is attached to the article having an adjusting screw, either with or without a set nut in the frame of the caster for raising or lowering the article on which it is fixed, as shown at fig. 1. This caster, with the screw, is for the purpose of adjusting the article to the exact hight required, and fixing it to a perfect level, which is often very difficult, on account of inequalities in the surface of the floor. In the improved caster, the large sphere or ball is made of glass, and the small one of ivory, or similar material, thus making it a double spherical insulator, peculiarly applicable to pianos, harps, or other musical instruments. When force is applied to the article to which the caster is attached, a re-action commences at *m*, which may be considered as the moving power of a lever shown by the dotted line *n*, having its fulcrum at *o*, about two-thirds of the diameter of the lower ball. The fulcrum *o* becomes the moving power of a shorter lever, shown by the dotted line, *p*, representing the other third of the diameter of the lower ball; the upper part, *p*, then becomes the moving power, which acts upon the smaller sphere or globe, *h*, causing it to move, oscillate, or rotate in its cup with endless changes of position, and allows the lower sphere to roll in any direction with ease and steadiness, the spheres being made of glass, iron, brass, wood, or other suitablemetal, or composition, and are admirably adapted for gun carriages, signal posts, turn-tables, sofas, pianos, harps, or any kind of furniture or article requiring to be moved about. Instead of the one smaller ball, *h*, in the cup, *i*, any desired number may be used; and also, instead of anti-friction propelling pulleys, balls or spheres may be employed, placed in suitable cups or holders, as shown in fig. 2. When desired, any of the cups for holding the spheres or balls may be bounded by india-rubber springs, or other material, in order to prevent noise.

SMITH'S APPLE PARER.



This figure represents the Apple Paring Machine, for which a patent was granted to Marvin Smith, of New Haven, Conn., on the 26th of August last.

A is the bed board of the machine; it is secured by screws at one end only to a table or bench. B is a hollow dished case secured to the board, A. This case is cast with a projecting arm, C, which supports the driving spindle, D. E is the handle for driving this spindle, and is firmly secured on its end. F is a sliding clutch collar which has a handle, H, for managing the fork, which it sustains, also the pinions which rotate the fork with the apple on it. G is the bevel pinion on the collar F; it gears into the pinion at *a* on the fork spindle, I. The collar of the handle, H, is loose upon spindle D, and swings upon it, moving the fork through the arc of a circle to the action of the paring knife. When the pinion, G, is rotated, as shown, by the handle, E, the pinion, *a*, rotates the apple fork with the apple, J, on it, against the knife blade, *b*, and the apple skin is stripped off between the blade and the guard finger, K, as represented. The knife stock, of which the guard, K, forms a part, is jointed at L to allow it and the knife to be moved up and down in the arc of a circle, as the operator moves the apple on the fork, by handle H (commencing at the stem,) up against it. A stiff spring presses the knife against the apple, J; the paring knife thus accommodates itself to the motion of the apple fork, which is managed by the operator's hand, as shown.

When the apple is pared, it is sliced as follows:—The wheel, M, gears into a pinion on the back of case B; this pinion is secured on the end of a small spindle, N, passing through the case; on this short spindle is secured the ogee plate, P, which has three slots in it. Over these are secured three slicing knives, *d d d*; at the cutting edge of each a small space is left open into the slots mentioned. When the apple is pared by the knife, *b*, the operator pushes over handle H, sliding collar F on spindle D—pushing and pressing the apple, J, against the face of plate P. The fork, R, is then pressed against the apple to prevent it rotating. The wheel, M, gearing into the pinion on spindle N, rotates the slicing disk, P, and its knives, *d*, slice the apple, J, as they rotate—the cut apple being carried through the slots into the inside of the case, B, and falling down through its bottom into a receiving vessel below. Apples can be cut very fine for making cider, or any other purpose, by the knives, *d*. The left hand of the operator directs or manages the apple against the paring knife, and the slicing knives, while his right hand rotates the apple when being pared, and also the knives, *d*, while being sliced.

This is a very neat and strong apple parer and slicer; it is not liable to get out of order. With it a boy twelve years old, after a little practice, can pare and slice a bushel in fifteen minutes, in the most perfect manner. O. F. Parsons & Co. have sold the right for the State of New York for $7,400, and the right for Massachusetts for $2,200.

More information may be obtained respecting it of the agents, O. F. Parsons & Co., No. 14 Chambers street, this city.

The Compass on Iron Vessels.

On the schooner *Mahlon Betts*, built in 1855, of iron, by Messrs. Betts, Pusey & Co., of Wilmington, Del., the compass, when in the binnacle, in the after end of the cabin, was so much affected by local attraction as to be entirely useless at sea. Learning that Capt. Morris, of the steamer *R. B. Forbes*, of Boston, (which vessel is also of iron,) had discovered and practiced the remedy; the owner applied to him, and the result was, the compasses were adjusted in their usual place, by means of magnets, so as to be reliable in a degree seldom attained even in vessels built of wood. And now after a trial of about one year on our coast, ranging from Boston to Savannah, the result has been very satisfactory—Captain Godfrey placing entire confidence in their correctness.

Wonderful New War Machine.

An article is now going the rounds of our cotemporaries, taken from a correspondent of the *Journal of Commerce*, this city, describing a most wonderful machine for annihilating armies, sinking ships, and bombarding cities. It is described as resembling a small grindstone, turned by a crank, and will discharge three hundred one ounce balls every minute, attended by only two men.

It is stated that the inventor is an American, now in England, and that the British Government has offered him $1,000,000 for it, if he can enlarge it so as to discharge six-pound shot. It is also stated that successful experiments were made with this machine at Washington before a board of naval officers, and one of the old Commodores remarked that "it could send a ship to the bottom in five minutes."

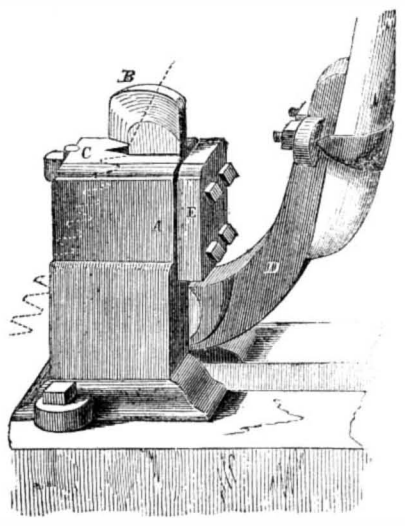
The account of this infernal machine is a fabrication; there is no such machine in existence. The maker of the story is perfectly qualified to shoot bullets with a cheese press.

Improved Saw Gummer.

This figure is a perspective view of the saw gummer for which a patent was issued to L. A. Dole, on the 9th of Sept., 1856.

A is the metal block or stock of the gummer, and is composed of two sides and top plate, with a recess in the middle, and is bolted down to the floor. B is the punching movable die, which is connected by a bar with the lever, D, which moves it up and down. C is the recessed stationary die, secured firmly in the top of block A. E is a plate which secures the bar of the ovable die, B, in place, to work up and do n. A saw, in dotted lines is represented being gummed in the machine; it rests on the die, C. The lever, D, which is a forked eccentric, is inserted in a recess in the stock, and securely attached to the lower end of the peculiar die bar; having its upper surface bearing against the shoulder formed by the recess, while the flanches below sustain it, giving both an upward and downward motion to the die, B, by a simple motion of the lever, D, without the aid of springs or other devices.

The body or stock of this gummer is compact in form, having securely fitted into it a heavy cast-steel die bar of a form peculiar to this gummer. The punching die, B, seen above the stock, projects from the front edge of the die bar, of which it forms a part; and being the only portion of the machine above the female die, on which the saw rests; an unobstructed view of the work is secured, while the greatest desirable facility for shifting the position of the saw is obtained.



The arrangement of the dies in this machine avoids all trembling or vibratory motion, rendering this machine equally adapted to gumming or cutting the teeth of mill, crosscut, circular, and other saws—giving the operator the privilege of alternately changing the saw, and also of cutting the teeth of any desirable shape without straining or twisting the saw.

Although extremely simple in its construction, this machine has arranged, in an ingenious manner, all the essentials desirable in a saw gummer, while many of the objections, common to this class of machines, are obviated.

Dole, Silver & Felch, of Salem, Columbiana Co., Ohio, to whom this patent was assigned, have commenced their manufacture with a view to supply the trade throughout the Union. Any desired information may be obtained by addressing them as above.

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Scientific American.

NEW YORK, JANUARY 10, 1857.

The Old Year and the New.

The Old Year has gone, but not its memories, nor its influences—these are immortal. It has seen science and art advance with stately steps.

Our continent and the Island of Newfoundland have been united telegraphically by the longest submarine cable ever laid down in American waters, and it is anticipated that, by the first of next January, Brother Jonathan and Uncle John Bull will be electrically shaking hands and wishing one another "A Happy New Year."

The company for carrying out this enterprise has been organized; it is composed of American and British capitalists, and the cable to carry messages beneath the billows of the great Atlantic is now in the course of construction; it is one of the grandest projects ever conceived by the mind of man.

The last meeting of the American Association for the Advancement of Science, at Albany, N. Y., was the largest ever held. The most important event connected with it was the inaugeration of the Dudley Observatory in that city—the first and only institution of the kind in the State of New York. It has been endowed with gifts to enable its corps of scientific observers to prosecute their researches in the starry heavens with the best instruments, and thus advance the sublime science of astronomy.

The subject which, of all others, excited most general attention, in connection with useful manufactures, was the method for manufacturing fine iron and steel from crude metal by the Bessemer process. Great things were claimed for it; it was asserted that it would revolutionize the whole manufacture; and that the best malleable iron and steel could be made by it nearly as cheap as pig iron. These statements have proven to be exaggerations.

The Birmingham (England,) *Journal*, a copy of which we received a few days ago, contains an analysis of some of Bessemer's iron, which proves it to be of an inferior character. It is not fibrous, nor is it ductile under the hammer. We hope that some other inventor will be more successful; there is still great room for improvements in the manufacture of iron.

The past has been an active year among inventors; more patents were applied for and more obtained than during any previous year. This is the best indication we could receive of the material advancement of our country. The useful arts only flourish where encouragement is given to inventive genius; and where they do flourish, peace, plenty, and prosperity generally attend them.

The New Year, we hope, will witness a still greater increase of new improvements; there is no dearth of subjects for exercising the genius of our inventors.

During the past year, disasters on the mighty ocean have been numerous and startling, especially with steamships. Collisions at sea have become more frequent with the rapid increase of commerce; new means of safety in ocean navigation are demanded—especially greater safeguards from fires and collisions.

We regret to state that more steamboat accidents occurred during the past than the previous year; and in our opinion, some of the investigations as to the cause of these disasters, were not creditable to the Inspectors.

In commencing the New Year, we should do so with a high resolve, to act better in the future than during the past. Every man should endeavor to do all the good he can, every day, whether it be in bringing out new and useful inventions, or in disseminating useful and elevating information. Let us all—each in his own sphere—commence this New Year with such intentions, and, if we do not grow weary in well-doing, the year eighteen hundred and fifty-seven will bring forth an abundant fruitage in science, art, and useful invention.

Extended Patents.—The Power of Congress.

A correspondent informs us that a question has arisen, in the place where he resides, which has elicited much discussion as to the results which would ensue if the Woodworth Patent, after having expired and been in public use for a certain time, were renewed and extended by Act of Congress. He says, "It is a question on which there exists a difference of opinion as to whether Congress can pass an *ex post facto* law—and should Congress extend the Patent of Woodworth, what will be the effect on machines running during the interval. The opinion of the SCIENTIFIC AMERICAN, as standard authority, is requested by many among us"

Congress has the power to pass an act to give a patent or extend a patent for a machine or invention which is already in public use; and it has exercised this power on many occasions; and there is one patent now in force under such a retrospective act—we allude to that of Thomas Blanchard, of Boston, for turning irregular forms. Letters Patent were granted to Mr. Blanchard on the 6th September, 1819, which were defective on account of an inaccurate specification: a reissue was granted on the 20th January, 1820, for fourteen years from *that date*—which could be done according to the old law. On the 13th June, 1834, Congress, by an act, extended his patent fourteen years from the 12th January, 1834—this was some months after it had expired. This act was somewhat vague and inaccurate. To amend it, an additional act was passed on the 6th February, 1839—above five years afterwards—which corrected the date of the previous act, which was the 12th instead of the 20th Jan., 1834. This act was retrospective so far as it related to the patent, but by a special clause, in its second section, any person who had *bona fide* erected or made a machine for putting his invention into use, between the expiration of the patent, 20th January, and the day on which it was extended by Congress, 13th June—four months and 22 days—was exempted from the claims of the patent. This section said, "he shall have and enjoy the right of using said invention in any such manufacture or machine, erected or erecting as aforesaid, in all respects as though this act had not passed."

In a case for infringement of this patent, which came up before Justice Story—the parties being Blanchard versus Sprague,—the validity of this retrospective Act of Congress was brought into question. The ground was taken by the defendant's counsel that the Act of Congress for extending the patent, was unconstitutional, "because it operated retrospectively, to give a patent for an invention which was in public use and enjoyed by the community at the time of its passage." Justice Story said: "For myself, I never entertained a doubt of the Constitutional authority of Congress to make such a grant, and the objection is fairly put at rest by a decision of the U. S. Supreme Court, in the case of the patent of Oliver Evans. The power is general to grant to inventors, and it rests in the sound discretion of Congress to say when and for what length of time, and under what circumstances, the patent for an invention shall be granted."

This decision settles the question regarding the Constitutional power of Congress to grant a patent for an invention to an inventor, even after it has been in public use.

Such a patent is not retrospective in its effects, as it relates to obtaining damages for the use of the invention during the period when no patent was in existence. This, it may be asserted, relieves such acts from being *ex post facto* law, against which Sec. 1 of Art. 1, of the Constitution, makes provision; but it is a subject worthy of further and deeper consideration.

Let us take a case for example, to show that out of a retrospective patent—such as the Woodworth would be, if extended hereafter by Congress—there might arise a very nice question of Constitutional law. If a person were to build and use a Woodworth Planer in the interim between the expiration and the extension of the patent, would such a person be compelled to stop the use of his machine, or pay toll to the Woodworth heirs or assignees after the patent was extended?

To this question let us answer, "Yes; unless such Bill contains a similar exemption clause to that in Blanchard's Bill," and for the following reasons:—

First, the Act was a Bill of Relief for the patentee's heirs, consequently, if those who erected or used such machines in the interim were to be exempted from the claims of the extended patent, then all those who formerly used such machines as licencees, would be exempted from toll, and thus the very end contemplated by the Bill would be defeated.

Second, the decision of Justice Story in the case referred to is an established precedent.

It is admitted that no damages could be claimed or obtained for the use of the machine while public property; but from the day the patent was re-extended the owners of these machines must cease to use them—they are no longer their property—that is the plain claim set up for for the extended patent. Are not such claims based upon *ex post facto* law? Yes, it must be so. It may not be so in name but it is so in reality. These machines were once the legal property of the individual persons who owned and used them. Can any law be other than *ex post facto*, other than unconstitutional, which would take away such property? Surely not, according to the Constitution, which provides that "private property shall not be taken for public use without just compensation."

If a person built a Woodworth Planing Machine to-day, and used it till next January, and then the patent were extended by Congress, would it not be unconstitutional to stop that person using his machine afterwards? It certainly would, in our opinion, amount to confiscation of his legal property—an unconstitutional act.

It appears to us to be a plain constitutional question on which there can be but one opinion, that a machine, or a thousand machines, or other articles once legally the property of one or a thousand persons (such as all the Woodworth machines now in use) are always the property of those individuals constitutionally, and if the decision were based on our interpretation of the Constitution and pure equity, they never can be deprived of their use.

Sulphuret of Carbon.

The article in the SCIENTIFIC AMERICAN of the 20th ult., on the new uses of the sulphuret of carbon—such as for scouring wool, &c., has attracted considerable attention, and inquiries have been made of us respecting its method of manufacture; and whether it was for sale in this city.

Of course any chemical, simple or compound, can be obtained of the chemists in this city, but sulphuret of carbon is not an article of general sale by our druggists. We will, however, give an account of its method of manufacture, so that those who desire to make experiments with it for any purpose, may do so. Its particular chemical name is bi-sulphide of carbon; charcoal ignited to full red heat in an atmosphere of sulphur vapor, combines with that element and forms a volatile liquid when condensed. It is prepared by distilling in a porcelain retort, of the common form, with a tap on its top for the reception of a tube to feed in sulphur, and a pipe attached to its neck to conduct the sulphide vapor through water. About two-thirds of the retort is filled with dry charcoal; it is then raised to a full red-heat in a furnace, and the sulphur in small scraps is gradually added at the top pipe. The sulphur is immediately converted into vapor, and in passing over the incandescent charcoal, volatizes some of it, with which it combines and then passes out of the retort, and is condensed while being conducted through ice-cold water. The pipe in the neck of the retort to carry off the sulphide carbon vapor, may be formed like a distiller's worm, in passing through the water into the vessel designed to receive it. It is heavier than water, and may be received into a vessel containing water, as it will sink to the bottom. It is colorless, but has a most offensive smell. It is very volatile and combustible—burning with a pale blue flame, and boiling at 108° Fah. It dissolves camphor, essential oils, and resins, and with the latter forms varnishes, which dry with great rapidity; it therefore promises to be very useful for the manufacture of various varnishes, as a substitute for turpentine, alcohol, and the alkalies.

Annual Award of Prizes.

A New Year has arrived, and agreeable to promise we now make public the names of the successful competitors for the THOUSAND DOLLARS offered for the twelve largest lists of subscribers for this volume of the SCIENTIFIC AMERICAN.

Greater than ever before has been the competition among our good patrons and friends, and we only wish that more might be rewarded for their exertions by being recipients of premiums, but as that cannot be, we trust each unsuccessful competitor will feel that he has been fully compensated for his trouble, in the satisfaction that, by his exertions, useful information is being disseminated among his neighbors and friends, which will help on the march of improvement, and the elevation of mankind in the scale of physical, social, and moral progress.

We tender our congratulations to our friends—the successful competitors—on their good fortune, and would suggest for their consideration the propriety of appropriating some portion of the amount awarded to them to the establishment of new libraries, or to the replenishing of those already established with new scientific and mechanical books and publications. The money, however, is yours gentlemen, and it is not for us to dictate to what uses it shall be applied. Each of you will understand how to make the best application of it to suit your own convenience.

Should any competitor discover a mistake in the number of subscribers accredited to him, he will oblige us by stating in what manner the error exists, that a correction may be made immediately.

	Name.	*Residence.*	*List.*	*Prize.*
I.	D. McPHERSON,	Louisville, Ky.	315	$200
II.	A. P. HOLLY,	Seneca Falls, N.Y.	227	$175
III.	H. S. BABBITT,	Newark, Ohio,	111	$150
IV.	JOHN GARST,	Dayton, Ohio,	108	$125
V.	W. C. GRANT,	Detroit, Mich.	101	$100
VI.	JOHN CANT,	Hamilton, C. W.	92	$75
VII.	M. KELLOGG,	Buffalo, N. Y.	91	$50
VIII,	J. L. DICKINSON,	Dubuque, Iowa,	87	$40
IX.	S. T. HOLLY,	Rockford, Ill.,	62	$30
X.	H. HOPKINS,	Evansville, Ind.	55	$25
XI.	JAMES OLD,	Alleghany City, Pa.	55	$20
XII.	T. R. BAILEY, Jr.,	Lockport, N. Y.	55	$10

The money will be paid on demand at our office, 128 Fulton street, in gold, or remitted, by express or mail, as the party ordering may direct.

Messrs. Hopkins, Old & Bailey having each furnished fifty-five subscribers are entitled to $18·33 each, which will make up the full amount of the three prizes.

The Cohesive Power of Public Plunder.

In our last number we pounced upon those dear friends of the public weal, "Lobby Agents." We stated that the public knew very little of what was transpiring in and around the halls of Congress. According to an estimate of a Washington correspondent, the following are the several sums of the stupendous schedule of spoils and plunder projects pending before Congress:—

Pacific Railroad (120,000,000 acres)	$150,000,000
Other State and Territorial Railroads,	20,000,000
Return of fire duties,	1,000,000
Chaffee, Hayward and Woodworth patent extension,	3,000,000
McCormick's reaper patent extension,	500,000
Hudson's Bay and Puget's Sound Companies' possessory rights,	1,000,000
Private land claims in California,	3,000,000
Bounties to speculators in claims of revolutionary officers and soldiers,	2,500,000
French spoliation claims,	5,000,000
Interest on the same,	15,000,000
Miscellaneous plunder,	10,000,000
Total,	$211,000,000

We have nothing to say in regard to these schemes only so far as relates to the Patent Extension cases. There are four mentioned in the above list, and we hesitate not to say, that Congress would do violence to the spirit of our entire Patent System—a system of its own manufacture—if it should pass either of these extensions. We are opposed to them all—earnestly and heartily—and we should fail to do our duty as independent journalists if we did not denounce them.

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Physiognomy.—Noses.

It is not only a generally admitted fact, that the human face indicates mental character, but all men act upon it instinctively. We form opinions of persons by reading their character in their faces; and we do so, as it were, by the force of impressions. We take a like or dislike to a person the first time we come in contact with him, and form an opinion of his character, favorable or unfavorable, from some impression—the face being regarded as the index of his mind. It has been attempted to reduce the form and expressions of the human face to a science, which has been named Physiognomy. It certainly has not yet deservedly earned for itself the name of "a science," although there are some general truths recognizable in it. About sixty years ago it was as popular as Phrenology was a few years since; its great apostle then was J. Caspar Lavater, whose writings have been translated into several languages, but his opinions have, for a number ot years, almost faded from remembrance. Recent efforts, however, have been made to revive them, thus showing that there are persons who still believe in the reality of physiognomy, and that it may yet be reduced to a science. Mr. Redfield, in this city, has written a work on the subject, in which he advances many new views, and in the last number of the *London Review*, for December, there is an article on the physiognomy of the human form, which shows that in Germany and France, the subject is now engaging considerable attention. In this article the opinions of a great number of eminent men are quoted, as believers in physiognomy, —Aristotle, Bacon, Fielding, Cowper, and others believed that the face was the index of the mind, and that they could read the character of a man by his face, as well as an author by his books. The opinions of great men are not to be credited as authority on any subject as establishing a doubtful question; the best of men are liable to mistakes. A science must be its own best witness—it must contain within itself the evidences of its own truthfulness. Aristotle's opinions of natural philosophy, from the stereotyped deference paid to them by those who pretended to learning—held science in bondage for many ages. What is there in Physiognomy itself that will stand the test of examination? Experience has taught every man that the first impressions of the character, judging from the faces of individuals, are often incorrect; although they may also have been frequently right. All that has yet been written on the subject, is more curious than useful, because of the infinite variety of form and expression in the human countenance, and which never can be reduced to rule nor system. However, some of the rules which have been laid down by the ablest writers on physiognomy, for judging of persons, will be of general interest to all. An abstract of some of them—the latest adopted, we will endeavor to present from the essay in the *Review* heretofore mentioned.

The Hair.—"Long, soft, and light hair will, in a man, betray a feminine or child-like character; dark, coarse hair in a woman will reveal her hard and too masculine nature. In a man, dark coarse hair symbolizes strength and firmness in whatever direction it may be directed. Brown and black hair are chiefly seen in those of active character; red and fair hair are associated with passiveness." The hair of Napoleon is said to have been soft and silky as that of a child; and the conquering Barbarossa was so named from his red beard. We therefore set down the above rules of judging of human character by the hair, like some of the rules of English grammar, in which the exceptions are too numerous to mention. Lavater always distrusted a man the color of whose hair contrasted with his eyebrows. "Natural loss of hair in men often indicates a richly productive power of mind. Its abundance, late in life, betrays poverty and inactivity of mind." These rules have also their exceptions. Men having bushy heads in old age, like Calhoun, have been distinguished in science, art, learning, and eloquence.

The Face.—"In general the upper half of the face has the symbols of the intellectual character and the feelings; the lower half those of the propensities and the will. The nose is symbolical of varieties of intellect; the eyes, of the disposition; the mouth, varieties of sensuous character."

"All noses less than one-third of the face in length, are of the small class. The varieties of these are numerous in the snub, flat, and up-turned or celestial. All such noses indicate defective intellectual power, and do so with a symbolism, which nothing but excellence in the form of the head, as in the case of Socrates, can neutralize." That is, Socrates was an exception to this rule of noses; so was William Pitt, the younger, and the only genuine portrait of Shakspeare, represents him with a rather short, but not pug, nor flat nose.

"The thicker and longer forms of snub nose in either sex commonly indicate the predominance of the material sensuous nature; and a turn-up nose, with wide obvious nostrils, is an open indication of an empty, inflated mind—a spurious imitation of that strength and lofty pride which the wide nostrils in a well-formed nose indicates."

Physiognomists are decidedly hostile to the up-turned nose: a form which we consider decidedly excellent for taking snuff, a plea that we cannot refrain from putting in for their credit.

'Large noses in men are generally good signs, especially they add emphasis to the good indications of a well-formed head, but they must not be too fleshy or too lean. If they are long, but not snout-like, they mark the intelligent, observant, and productive nature of the refined mind. If Roman, arched, high, and strong, they are generally associated with a less developed forehead and a larger hind head; they disclose strength of will and energy, rather than intellectual power; they also show a want of that refinement indicated by the straighter nose. The Jewish or hawk-nose indicates shrewdness in worldly matters; it adds force to the narrow concentrative forehead symbolical of singleness of object; and its usual narrow nostrils wear the unfailing sign of caution and timidity. The Greek straight nose indicates refinement of character, love for the fine arts, astuteness, and craft, rather than direct action. A nose slightly bifed at its end indicates an analytic mind. Such noses, large and broad pointed, are frequent in men with acute practical knowledge of the world. The nose wide-nostrilled, wide at the end, thick, and broad, indicates a mind that has strong powers of thought and is given to close and serious meditation. A nose whose ridge is broad, no matter whether straight or curved, always announces superior faculties. A small nostril is the certain sign of a timid spirit. A thick fleshy nose indicates grossness and sensuality. A lean, sharp nose indicates want of fervor and a selfish adhesion to the formalities of life."

These opinions of physiognomists respecting the characteristics of noses, relate only to those of men; but they hold that those noses of ill-omen in men are really worse in women. These opinions must not be held correct, for universal application, and yet there is much truth contained in them, as common observation will teach any man. They are, however, curiously interesting, as attempts made by some naturalists to reduce to a science, as an index of mind and character, the actual forms of men.

Reform of Weights and Measures.

The following is an extract from the Report of Professor Henry, Secretary of the Smithsonian Institute:—

"I am much interested in the subject of a uniform system of weights and measures. Nothing, except the diversity of language, tends so much to retard the advance of civilization, and to prevent the condition in which man of every clime and every nation will belong to one great brotherhood, as the different units and divisions of the measures of quantity and quality. I directed the attention of the Regents to the subject in my last annual report, and presented the same subject to the President and his Cabinet at the last meeting of the establishment of this institution. I doubt not that Congress, in due time, will take up the matter, and that an international conference will be held in regard to it. Every day renders the importance of a uniform system more apparent; and, since steam and electricity are bringing the most distant parts of the earth into nearer communication, the necessity of removing all barriers to mental intercourse will become more imperative."

Original Recipes for Electro-Plating, Gilding and Brassing.

Messrs. Editors—Enclosed you will find a few practical recipes for the electro-metallurgist. I believe it is the first time that a solution for plating direct on iron, steel, or britannia metal has been published.

In most of my experiments I have used Smees' battery; but for depositing brass, I prefer a battery fitted up as Groves', using artificial graphite—obtained from the inside of broken coal gas retorts—in the place of platinum. With one large cell (the zinc cylinder, being 8 × 3 inches, and excited with a mixture of 1 part sulphuric acid and 12 parts water, the graphite being excited with commercial nitric acid,) I have plated six gross of polished iron buckles per hour with brass. I have also coated type and stereotype plates with brass, and find it more durable than copperfacing. Richard Wood.

Springfield, Mass., January, 1857.

To prepare Cyanide of Silver.—First preparation.—Dissolve one ounce of pure silver in two ounces of nitric acid and two ounces of hot water, after which add one quart of hot water.

Second preparation.—Dissolve five ounces of the cyanide of potassium in one quart of water.

To the first preparation add by degrees a small portion of the second preparation, until the whole of the silver is precipitated, which may be known by stirring the mixture and allowing it to settle. Then drop into the clear liquid a very small quantity of the second preparation, from the end of a glass rod; if the clear liquid is rendered turbid, it is proof that the whole of the silver is not separated; if, on the other hand, the liquid is not altered, it is proof that the silver is separated. The clear liquid is now to be poured off, and the precipitate—which is the cyanide of silver—washed at least four times in hot water. The precipitate may be now dried and bottled for use.

To prepare Cyanide of Gold.—Dissolve one ounce of fine gold in a mixture of 1-4 ounce of nitric acid and two ounces of muriatic acid; after it is dissolved, add one quart of hot water, and precipitate with the second preparation, proceeding the same as for cyanide of silver.

To prepare Cyanides of Copper and Zinc.—For copper, dissolve one ounce of sulphate of copper in one pint of hot water. For zinc dissolve one ounce of the sulphate of zinc in one pint of hot water, and proceed the same as for cyanide of silver.

The electro-plater, to insure success in plating upon all metals and metallic alloys, must have two solutions of silver: the first, to whiten or fix the silver to such metals as iron steel, britannia metal and German silver; the second to finish the work, as any amount of silver can be deposited in a reguline state from the second solution.

First, or Whitening Solution.—Dissolve 2 1-2 lbs. (Troy) cyanide of potassium, 8 ounces carbonate of soda, and 5 ounces cyanide of silver, in 1 gallon of rain or distilled water. This solution should be used with a compound battery of from three to ten pair, according to the size of the work to be plated.

Second or Finishing Solution.—Dissolve 4 1-2 ounces (Troy) of cyanide of potassium, and 1 1-2 ounces of cyanide of silver, in one gallon of rain or distilled water. This solution should be used with one large cell of Smee's battery, observing that the silver plate contains as near the surface of the articles to be plated as possible.

N. B.—By using the first, or whitening solution, you may insure the adhesion of silver to all kinds of brass, bronze, red cock metal, type metal, &c., without the use of mercury, which is so injurious to the human system.

To prepare a Solution of Gold.—Dissolve 4 ounces (Troy) of cyanide of potassium, and 1 ounce of cyanide of gold, in 1 gallon of rain or distilled water. This solution is to be used warm, (about 90° Fah.) with a battery of at least two cells.

To prepare a Solution of Copper or Zinc.—Dissolve 8 ounces (Troy) cyanide of potassium, and 3 ounces of cyanide of copper or zinc in one gallon of rain or distilled water. These solutions to be used at about 160° Fah. with a compound battery of from 3 to 12 cells.

To prepare a Solution of Brass.—Dissolve 1 pound (Troy) cyanide of potassium, 2 ounces of cyanide of copper, and 1 ounce of cyanide of zinc, in 1 gallon of rain or distilled water; then add 2 ounces of muriate of ammonia. This solution to be used at 160° Fah. for smooth work, and from 90° to 120° for ornamental work, with a compound battery of from 3 to 12 cells.

Gold can be deposited of various shades, to suit the artist, by adding to the solution of gold a small quantity of the cyanides of silver, copper or zinc and a few drops of the hydrosulphuret of ammonia.

[Our correspondent—Professor Wood—is a practical chemist and electro-metallurgist.—For the sake of advancing practical useful science, he has given the above receipts to the public.—Eds.

Shot Towers.—Manufacture of Shot.

In our last volume we described the iron shot tower which had been erected by Mr. Bogardus for Mr. McCulough, in Center st., this city, the first of its kind in the world, and which is quite a unique affair in New York as it somewhat resembles one of the ancient war towers so common in the old European countries.

Recently we have perceived another shot tower gradually growing upwards, day after day, in our city, and it is now nearly completed outwardly. It is being built for Messrs. Tatham & Brothers, the great lead pipe manufacturers in Beekman street, next to St. George's Church. Its hight is to be 217 feet from the foundation, its form octagon, and the material brick, inclosed in sections by iron columns. Each of these columns rests upon a massive brick foundation, being anchored to a weight of 30 tuns, each weight connected by inverted arches with its fellows. The columns of each section are joined by iron girders, bolted with 1 3-8 inch bolts. The total weight of iron employed in the construction of this tower is 237,000 lbs.

A few years since we illustrated a new method of making shot without erecting a high tower, by causing the shot to be retarded in their descent by a strong current of air forced up against them. The manufacture of shot has been carried on by this invention in this city, but it seems to have proved more expensive than the old plan, and is, we believe, abandoned.

Aluminium Cheap as Iron.

In an interview we recently had, says a writer in the London *Medical Times*, with one of the firm of Rosseau, who have obtained a patent for the process of obtaining aluminium from clay, this gentleman informed us that he had little doubt of being able to obtain the metal at as low a price as iron; thus in a few years we may be carried across the ocean in ships of aluminium, and our bells and musical instruments, all our cooking utensils, and an immense number of articles of daily use and ornament, will, in all probability, be made of this light, beautiful, indestructible product of clay.

Progress of Australia.

The progress of this island continent is really astonishing—rivalling that of our Western States. On the 25th of August, 1855, the population of Victoria amounted to 150,905 souls, including 100,220 men, 28,843 women, and 27,842 children. Of this number 22,471 were emigrants from China. The cluster of colonies in Australia had scarcely any existence commercially twenty years ago, now import from Great Britain goods to the value of $70,000,000 annually. Its produce of gold now surpasses that of California.

A buried Greek city has been discovered near Cos, in the Levant. A steam frigate has been fitted out by the British government with a *corps* of scientific men, to make excavations in it, and to take photographic pictures of all which they may discover.

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B. R. McC, of Pa.—We really do not know the pressure on the wind-chest of the automaton clarionet player. We never thought of making the inquiry. You state the object of the SCI. AM, correctly, viz., "to popularize science in all its branches."

A. K. R. of Ohio—In Vol. 9, SCI. AM., there is a series of articles on all kinds of water wheels. We have seen a number of water wheels operating on the same principle as the sliding piston rotary steam engine. They give an average of 60 per cent. of the stated power.

J. A. S., of Phila.—So far as we know, the expansibility of aluminum from 32 to 212 degs. Fah., has not been determined, but it cannot be much.

A. L. & W, E. I., of Pa.—There is no power in a water wheel itself; the power is the water. Over a fall of 26 feet with an area of 36 inches inlet opening, 1548 cubic inches fall per second—not quite two horse power. You surely have made a mistake respecting the size of the opening.

X. Y. Z. of Vt.—Correspondents who expect attention to their letters must sign their names to them. When we take up a letter which has not the writer's name attached we always cast it into the waste basket. It is not courteous to ask a favor of any one without giving your name.

J. L. H., of N. Y.—Robert DeWitt, of this city, is now publishing Ranlett's Street Architect. He can also furnish you with Ranlett's Cottage Architecture. Address him at 150 Nassau street.

H. M. P. of N. Y.—A spiral grooved feed roller is not patentable. We think such a spinning machine as you mention is new.

W. R. Jr. of Pa.—There is no difficulty in connecting the front and back driving wheels of a locomotive by Whitegreave's method, to make them work in harmony.

R. O. of C. W.—An over-shot wheel would be far better for your purpose than the wheels to which you refer

W. M. A. of Ohio.—Will you describe the uses of your syphon more fully, also its object? The subject is of general interest. A syphon is of no use for mines over 30 feet deep.

J. M. B. of N. Y.—The plan you propose for a suspension bridge over the East River has been suggested before.

D. S H. of ——.—Address Douglass & Sherwood, 343 Broadway. We do not know of any othe manufacturers of hoop skirts, although, no doubt, there are many others.

James M. Ross, of Pictou, Nova Scotia, wishes to obtain a power drill for working in quarries.

J. W. B. of Pa.—We should be glad to give you the information you want in regard to the best method of preparing the wood for the bending frame, but we do not think of anything that would be useful to you in this regard.

M. B. C. of Mass.—Stove pipe made of cast iron might have screw joints.

C. S. of C. W.—We are not acquainted with any substitute that can be used to take the place of molasses in the manufacture of printer's rollers; many things have been tried, but none have been successful. The molasses you obtain are the drainings of crystalized sugar; this is the reason why the molasses crystalizes when concentrated, and why it will not answer for rollers. It is our opinion that if you mix some Canadian balsam with your molasses it will not crystalize, and thus it may serve for manufacturing printer's rollers as well as West India molasses.

T. ——. of Pa.—There was an Association of Civil Engineers formed in this State about eight years ago, but it only existed, we think, about two years. It promised well when it started. There is no Association of Engineers in our country like that in England.

D. S. of Conn.—The work on Draughting is for sale by Blackie & Sons, 117 Fulton st., N. Y. Price $10·50.

J. M. of Pa.—We are not acquainted with any single work on gunpowder, statistical or otherwise, appertaining to its use and manufacture in our country.

M. A. A. S., of Ohio.—We have received your samples of slate colors dyed on cotton, and the description of the method of dyeing them. We cannot advise you to apply for a patent; the same color can be dyed cheaper by methods in common practice.

C. J. N. of Me.—Another correspondent has taken up the subject of seeing the satellites of Jupiter with a looking-glass. Do not be so officious in giving advice without a knowledge of subjects.

J. H. of Ohio.—The water in Artesian wells rises to the surface and overflows. Address Welton, Stearns & Holmes, Artesian well engineers, Charleston, S. C. We do not know the cost of apparatus for boring such wells.

E. B. of Ohio.—Inflammable gases can easily be ignited by electricity.

Y. N. of N. Y.—The term "Minie rifle" is incorrect; it is the Minie ball which allows of muskets being rifled.

L. M. F. of N. Y.—Calculate the expense of a tunnel under the East River before you propose it publicly.

O. S. H. of N. J.—A circular saw of 3 feet diameter can be run at the rate of 200 revolutions per minute as easily as an 18-inch. saw 400 revolutions per minute. We cannot tell you what speed of saw teeth is most effective. Different kinds of timber require different velocities of the saw; there is no general rule. Sawyers differ much in opinion regarding the best speed for saws.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, Jan. 3, 1857:—

J. T. of Pa. $25; J. & K. of Mass. $5; J. F. P. of N. Y. $25; W. W. D. of Cal. $20; S. B. of N Y. $20; G. L. W. of N. H. $27; P. E. of Ala. $20; G. M. M. of Ct. $30; J. W. of R. I. $400; J. O. of Ill. $30; J. H. L., of Vt. $40; A. W. of N. Y. $30; E. R. C. of N. C. $30; A. B. of N. Y. $30; I. W. S., of N. J. $30; T. J. C. of N. Y. $50; S. P. F. of N. B. $40; W. H. McN. of N. Y. $100; E. H. H. of Ga. $25; C. & S. of N. Y. $305; B. A. H. of N. Y. $12; J. W. H. of R. I. $50; J. H., Jr., of N. Y. $180; B. T. B. of N. Y. $55.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Jan. 3, 1857:—

C. T. W. of O.; P. E. of Ala.; J. F. P. of N. Y.; J. T. of Pa.; J. & K. of Mass.; G. L. W. of E. H.; E. Q. S. of O.; E. H. H. of Ga.; J P. of Tex.; B. A. H. of N Y.; P. C. of N. Y.; P. H. of Ill.; W. W. D. of Cuba, J. W H. of R. I.; J. H Jr., of N. Y. (2 cases); B T. B. of N. Y

Important Items.

GIVE INTELLIGIBLE DIRECTIONS—We often receive letters with money enclosed, requesting the paper sent for the amount of the enclosure but no name of State given, and often with the name of the post office also omitted. Persons should be careful to write their names plainly when they address publishers, and to name the post office at which they wish to receive their paper, and the State in which the post office is located.

FOREIGN SUBSCRIBERS—Our Canada and Nova Scotia patrons are solicited to compete with our citizens for the valuable prizes offered on the next volume. [It is important that all who reside out of the States should remember to send 25 cents additional to the published rates for each yearly subscriber—that amount we are obliged to pre-pay on postage.]

COMPLETE SETS OF VOLUME XII EXHAUSTED.—We regret that we are no longer able to furnish complete sets of the present volume. All the back numbers except 1, 2, 6, 9, 10, 11, and 13, we can yet furnish, if new subscribers desire to commence back to the beginning of the volume; but unless they specially request to the contrary when making their remittance we shall commence their subscription from date of receipt of the order.

INVENTORS SENDING MODELS to our address should always enclose the express receipt, showing that the transit expenses have been prepaid. By observing this rule we are able, in a great majority of cases, to prevent the collection of double charges. Express companies, either through carelessness or design, often neglect to mark their paid packages, and thus, without the receipt to confront them, they mulct their customers at each end of the route. Look out for them.

PATENT LAWS AND GUIDE TO INVENTORS.—This pamphlet contains not only the laws but all information touching the rules and regulations of the Patent Office. Price 12 1-2 cents per copy. A Circular, giving instructions to inventors in regard to the size and proper construction of their models with other useful information to an applicant for a patent, is furnished gratis at this office upon application by mail.

RECEIPTS—When money is paid at the office for subscription, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a bona fide acknowledgment of the receipt of their funds.

PATENT CLAIMS—Persons desiring the claim of any invention which has been patented within fourteen years can obtain a copy by addressing a letter to this office stating the name of the patentee, and date of patent when known, and enclosing $1 as fee for copying.

Literary Notices.

REPRINTS OF THE BRITISH REVIEWS.—Messrs. Leonard Scott & Co., No. 54 Gold, st., this city, publishes the four famous British Reviews—the Edinburgh, London, Westminster, and North British—also Blackwood's Magazine. These Reviews and Old Ebony present to American readers the very cream of British literature. To be intelligent of what is doing by the ablest writers of the Old World, no man can afford to dispense with these periodicals. They are exponents of the opinions, tastes, and the talents of British authors. Blackwood's Magazine is Tory in politics, but its literary character, independent of its politics, is unequalled. The Edinburgh Review is Whig, in contradistinction to Tory. Its reputation is world-wide. The North British is the organ of the Scottish Free Church. It is learned, progressive, and liberal. The London Quarterly was established to counteract the influence of the Edinburgh. It represents ultra views of politics and religion. The Westminster commenced as ultra radical, but it is now called liberal. John Chapman, the American publisher in London, is at its head. These four Reviews and Blackwood are $10 per annum. This is an excellent time to subscribe.

PARLOR DRAMAS FOR HOME AMUSEMENT.—This is the title of a very amusing little volume, by W.B. Fowle, published by Morris Cotton, Boston, and for sale by J. M. Fairchild, 109 Nassau street, this city. Its author has great powers of descriptive dialogue. It is a volume which, taken up at any moment; any of its pages, selected at random for reading, will shake the cobwebs of care from the corners of the mind.

NOW OR NEVER—THE ADVENTURES OF BOBBY BRIGHT—By the author of "Oliver Optics,"—who writes with his optics open—is the story of a noble boy who never would tell a lie, and whose life is a fine example for imitation. It is a moral and well written tale. For sale by Leavitt & Allen, this city. Published by Brown, Bazin & Co., No. 94 Washington street, Boston.

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December 22d, 1856. 18 5

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BOILER INCRUSTATIONS PREVENTED—A simple and cheap condenser manufactured by Wm. Burdon, 102 Front st., Brooklyn, will take every particles of lime or salt out of the water, rendering it as pure as Croton, before entering the boiler. Persons in want of such machines will please state what the bore and stroke of the engines are, and what kind of water is to be used. 14 tf

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Science and Art.

Snuff.

Though we advocate the proper use of the olfactory sense, yet we repudiate snuff; nevertheless, we will point out the analogy between the use of scent and the use of snuff. By a singular perversity of human nature, the snuff-takers declare, almost to the majority of one, that they dislike scent; we have, however, only to show that snuff is scent in a high degree, and then leave the reader to decide the question.

Two-thirds of the snuff that is taken owes its fragrance to ammonia, the tobacco leaf merely serving as a medium to bring the ammonia to the nose. The moist tobacco leaf certainly imparts a peculiar odor to the snuff that is made from it, but still it is to the ammonia that it owes its peculiar pungency. In this respect, then, we can only compare the snuff-box to the ladies' smelling-bottle; they are both mediums for conveying ammonia, either plain or modified by certain other odorous bodies, for the purpose of disguising its real smell, to the olfactory nerve.

The reader will now see our reason for placing snuff in the same section of odoriferous bodies as "smelling salt."

Like every other substance that is capable of being modified by man, there are snuffs in infinite variety.

The plain snuffs are of two kinds; that is, Scotch and rappee. Irish is but a slight modification of Scotch. The Irish and Scotch snuffs are made from the stalks of the tobacco leaf, which, in truth, otherwise would be a waste product of segar manufacture. When the tobacco leaf is being made into segars, the stalks and fibres are cut out of the leaf, otherwise it would not roll up properly; when these fibres have accumulated sufficiently, the snuff-making process is begun. If the snuff is to become any of the high-dried qualities, then the material has to be sent to an oven, and there dried to that extent required for particular denominations. Lundyfoot is remarkable as being dried almost to the extent of burning, hence this favorite snuff always has a burnt wood smell; after this process it is sent to the snuff-mills, to be ground to titillating dust.

The Irish and common Scotch is made entirely from the stalk of the tobacco-leaf. The best Scotch contains a portion of the leaf mixed with the stalk.

The moist snuffs are prepared in another way, thus:—After sufficient stalks have accumulated in the manufactory, they are cut up into pieces of about the 1-16th to 1-8th of an inch in length, and placed in a large trough, in lots of from one hundred weight to double that quantity. As the material is put in, it is thoroughly moistened with water in which is dissolved, for some varieties, carbonate of ammonia, and for others, muriate of ammonia; in this state it is left to ferment or ripen from about one to two months, according to the weather; in a fortnight or more after this treatment, the material begins to "heat," and it is now that the future aroma, or *flavor*, as the makers term it, is decided; for if it becomes too hot, the ammonia is dissipated, and if not hot enough, then the ammoniacal fragrance is not sufficiently developed. It must be observed that tobacco in any form, when moist, and allowed to heat, produces ammonia from the elements of its own composition; in this respect it is only like other vegetables containing nitrogenous compounds; the final odor of the snuff depends on the peculiarities of the various tobaccos employed, such as American, Cuban, &c. After the fermentation is complete, the material is sent to the mill to be ground.

"Rappee," which means little leaf, is considered a finer quality of snuff than the former, and is prepared by similar process; it consists, however, of leaf tobacco, and contains little or no stalk. The ammoniacal smell is much stronger in rappee snuff than in others.

There are, however, several other kinds of snuff, which by their popularity will induce us to claim all who use them—and they are a legion—as patrons of the "Art of Perfumery." These are "Prince's Mixture," which is a rappee scented with otto of rose; and "Queen's Scotch," which is perfumed with bergamot.

The snuff-makers were the first to teach the perfumers to what an extent the fragrance of the Tonquin Bean was admired; even now, if a perfumer makes a mixture containing Tonquin Bean extract, in excess, he is charged with making his perfumery smell like snuff.

A delightfully scented snuff, called "Wallflower," is made by Messrs. G. and S. Goodes, of Spitalfields, Eng., who seem determined to bring snuff into fashion, as it was in the reign of Good Queen Anne. SEPTIMUS PIESSE.

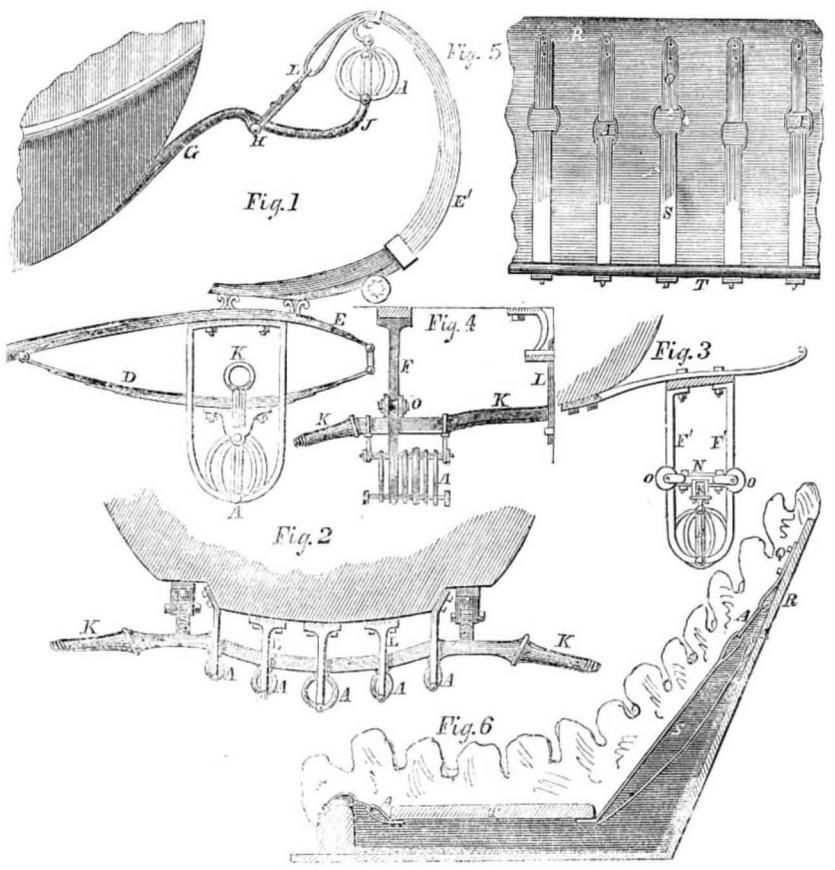
London, 1856.

Printing Textiles by Light.

A mode of printing textile fabrics by the chemical action of light has been brought to notice under the term of "chromatic photo-printing." The author, Mr. R. A. Smith, of London, proposes to employ the chemical agency of light in dyeing or staining textile fabrics; the cloth, whether wool, silk, flax or cotton, being first steeped in a suitable solution, then dried in the dark, and subsequently exposed to the action of light those parts which are to form the pattern being protected by pieces of darkened paper, or some other proper material, attached to a plate of glass. When the desired effect is produced, the time for which varies from two to twenty minutes, according to the nature of the process, the fabric has to be removed, in order to undergo a fixing operation, whilst a fresh portion of it is exposed to the light. This may easily be effected by the use of a very simple mechanical arrangement so that a number of photographic engines may be placed side by side and operated.—[Exchange.

[This plan is perfectly practicable, but far two expensive and troublesome, and besides, it only can produce one color.

CARRIAGE SPRINGS.



There are more carriages of every description made and used in the United States than in any other country, and perhaps it is not beyond the mark to assert more than in all other countries put together. Any improvement relating to carriages, therefore, whether it be in arrangement, form, combination, or the material of which they are made, is of great interest, we consider, to a very large and important class of our manufacturers and mechanics.

The accompanying figures are views of combination carriage springs, for which a patent has recently been taken out in England by G. N. & W. Hooper, and which are illustrated in the London *Engineer*.

The invention relates to the employment of india rubber springs in combination with the steel bearing springs of carriages, and also to the employment of india rubber springs for suspending the cushions of carriages and chairs in such a manner that a compensation action is obtained in proportion to the weight or load to be carried or supported.

The patentees describe several modifications, and the illustrations represent several forms of springs well-known to carriage builders, such arrangements being shown as fitted with compensating springs. These compensating springs consist either of straight lengths or strips of vulcanized india rubber, or of endless bands or rings, such rings or strips being of different sizes or lengths, and made to embrace studs or pins. The effect of this arrangement is that when the steel springs are called into play or deflected, they bring into action successively one or more of the compensating springs, by pulling or stretching them out between the holding pins; and as the compensating springs are of gradually increasing or decreasing lengths or diameters, it follows that the shorter for smaller ones will be called into play first, then the next larger ones, and so on, until the whole of them, whatever their number, may be brought into action.

Fig. 1 represents the application of a double set of compensating springs to the springs of a carriage, one set being applied to the double elliptical or under springs, D E, and another set applied to the C-springs, E′, the body loop, G, in this case being extended beyond the point, H, where it is slung by the braces, L, in the ordinary manner up to the point, J, where it is connected to the set of compensating springs, A, the springs themselves being suspended from the ends of the C-springs. K is the axle.

Fig. 2 represents a back elevation of an omnibus fitted with the compensating springs which are suspended from pins on the under side of the axle, K. L L are a series of stays or brackets, secured to the under side of the vehicle, and furnished at their lower ends with pins, which project inside the rings, A, forming the compensating springs. As these rings are of different sizes, it follows that the smaller ones will come into action first, as shown by the two extreme rings near the ends of the axle, which are represented as partially distended, whilst the rest are not as yet brought into play.

Figs. 3 and 4 represent two views of an arrangement wherein steel springs are altogether dispensed with, the vehicle being entirely suspended on compensating springs, A, of various lengths or diameters, as before described.

The axle, K, is fitted with two cross heads or bars, N N, which carry anti-friction or guide rollers, O O, either of india rubber or of metal covered with india rubber, for the purpose of allowing the body to play along the fixed guiding brackets, F′ F′, between the lower ends of which brackets and the axle are fitted the compensating springs, A A. The upright rod, L, is attached to the axle, and works through a hole in the metal stay or bracket, the hole being lined with wood or some other material to prevent a rattle; this rod and stay or bracket, or an arrangement to answer the same purpose, are necessary, in order to prevent the axle from turning over instead of remaining in its proper position.

Figs. 5 and 6 represent respectively a vertical section and under side plan of a seat suspended on compensating springs, such arrangement being applicable to seats or beds and mattresses for ordinary use, as well as to the seats of carriages.

A A are the compensating springs, which may consist, as described, of vulcanized india rubber rings, or of straight lengths of india rubber, of different sizes. Each ring is connected at one side with a strap, Q, secured to the back board, R, and the other side with a second strap, S, attached to the back portion of the board, T, which forms the foundation of the seat. This board is suspended at the front edge by india rubber rings, A, or straight lengths of different sizes, so that the entire seat will adjust itself perfectly to any greater or less load which may be placed upon it.

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Calculations have been made at the Observatory of Paris, that from the present time to the nineteenth century there will be only six total eclipses of the sun, not one of which will be visible in France, viz:—In 1860, 1861, 1870, 1897, 1899 and 1900; so that from the year 1000 to 1900 there will have been 255 eclipses of the sun, with only one total for Paris, on August 12, 1653.

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Inventors, and Manufacturers

TWELFTH YEAR

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